

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

CLAIMS

1. (Currently Amended) A corner-pumping method for high power slab laser comprising:
directing a pump light from one or more pump light sources each consisting of a high power diode array and its coupling system into a laser slab through prior cut-off slab corners [[faces]] of said laser slab without restriction to the incident angle or the polarization state of the pump light, wherein said laser slab is a convex polyhedron having one or more cut-off corners [[faces]], which is formed by cutting one or more [[sides]] edges and vertexes of a rectangular parallelepiped, and includes an undoped circumambient portion and one or more doped central portions, wherein said undoped circumambient portion and said one or more doped central portions are diffusion bonded without gaps between them, said undoped circumambient portion has said corner faces and a plurality of lateral surfaces used as inner reflective surfaces, and all the plurality of lateral surfaces are planar;

propagating said pump light within said laser slab, wherein said pump light firstly pass said undoped circumambient portion, secondly pass said doped central portion, thirdly pass said undoped circumambient portion again, and fourthly take inner reflection at the plurality of lateral surfaces of said undoped circumambient portion, and by repeating these steps, achieve multi-pass absorption; and

substantially absorbing the pump light by the said doped central portion during propagating.

2.(Currently Amended) The method as recited in claim 1, wherein cut-off corners ~~[[faces]]~~ of said undoped circumambient portion are coated for high transmission for the wavelength of the pump light, and the plurality of lateral surfaces of said undoped circumambient portion are coated for high reflection for the wavelength of the pump light.

3. (Previously Presented) The method as recited in claim 1, wherein a laser light propagates inside the laser slab in a zigzag optical path.

4. (Previously Presented) The method as recited in claim 1, wherein the step of absorbing achieves a high absorption efficiency through multi-pass absorption of pump light inside said laser slab.

5. (Canceled)

6 (Currently Amended) A corner-pumped laser gain module for high power slab laser comprising:

a laser slab being a convex polyhedron having one or more cut-off corners ~~[[faces]]~~, which is formed by cutting one or more ~~[[sides]]~~ edges and vertexes of a rectangular parallelepiped, and including an undoped circumambient portion and one or more doped central portions, wherein said undoped circumambient portion and said one or more doped central portions are diffusion bonded without gaps between them, said undoped circumambient portion having said cut-off corners ~~[[faces]]~~ and a plurality of lateral surfaces used as inner reflective surfaces, and all the plurality of lateral surfaces being planar; and

one or more pump source providing a pump light, each pump source consisting of a high power diode array and its coupling system;

wherein said pump light from said one or more pump sources directly incident into said laser slab through prior cut-off slab corners [[faces]] of said undoped circumambient portion without restriction to the incident angle or the polarization state of the pump light, firstly pass said undoped circumambient portion, secondly pass said doped central portion, thirdly pass said undoped circumambient portion again, and fourthly take inner reflection at the plurality of lateral surfaces of said undoped circumambient portion, and by repeating these steps, achieve multi-pass absorption, and substantially absorbed by the said doped central portion during propagation; and

wherein said laser slab outputs an amplified laser beam.

7. (Currently Amended) The laser gain module as recited in claim 6, wherein the number of said cut-off corners [[faces]] is four.

8. (Canceled).

9 (Previously Presented) The laser gain module as recited in claim 6, wherein a cross section of said doped central portion is rectangular or square or circular.

10. (Previously Presented) The laser gain module as recited in claim 6, wherein said corner faces of said undoped circumambient portion are coated for high transmission for the wavelength of the pump light, and the plurality of lateral surfaces of said undoped circumambient portion are coated for high reflection for the wavelength of the pump light.

11. (Previously Presented) The laser gain module as recited in claim 6, wherein the input beam and the output beam are located at one same side of said laser slab, said input beam and said output beam forming an angle with each other.

12. (Previously Presented) The laser gain module as recited in claim 11, wherein two mirrors are placed at another side of the said laser slab symmetrically with respect of said input beam and said output beam.

13. (Previously Presented) The laser gain module as recited in claim 6, wherein said coupling system including two cylindrical lenses and a lens duct, said two cylindrical lenses being placed between the diode array and the lens duct, generatrices of said two cylindrical lenses are orthogonal to each other and are parallel to fast axis and slow axis of said diode array, respectively.

14. (Previously Presented) The laser gain module as recited in claim 6, wherein said coupling system being a fiber bundle.

15.-18. (Canceled)